

***TITLE***

A METHOD OF DECIDING A DOZING STATE WHILST DRIVING

***ABSTRACT***

The present invention is directed to a method of deciding a dozing state whilst driving by detecting a driver's eyes during night driving. The present invention projects infrared rays onto the driver's face during night driving; receives an image of the driver from a CCD camera; simply divides the detected image into two parts of the image having a low frequency and the image having a high frequency according to a reference value, and outputs them; attains a pixel size represented on the high frequency part and a reference coordinate; regards the portions of pixels having a smaller size than a certain standard as noise and eliminates such noise; detects the driver's current eyes in comparison with the past images of the eyes after locating the initial location of the eyes; and if white portions are not continuously represented on the location of the eyes, considers it as a dangerous situation, and gives an alarm.

As described above, the present invention detects the driver's current eyes in comparison with the past images of the eyes, and analyzes a certain portion of the image instead of the whole image, such that the present invention can process the image in real time and provide the deciding method which can increase the reliability of the dozing state whilst driving alarm system during night driving.

***BRIEF DESCRIPTION OF THE DRAWINGS***

Fig. 1 is a block diagram of a dozing state whilst driving alarm system according to an embodiment of the present invention.

Fig. 2 is a flow chart of a method of deciding a dozing state whilst driving according to an embodiment of the present invention.

Fig. 3 is a flow chart of a binary process of the Fig. 2

Fig. 4 is a flow chart of a clustering process of the Fig. 2

Fig. 5 is a chart showing a method of detecting the pixel that "1" is endowed in the clustering process.

Fig. 6 is a chart showing a method of investigating the value endowed to the pixel in

the clustering process.

Fig. 7 is a flow chart illustrating the process of eliminating noise in the Fig. 2.

Fig. 8 is a flow chart illustrating the process of setting the location of the eyes.

Fig. 9 illustrates an embodiment which satisfies the distinction condition of the two eyes.

Fig. 10 illustrates an embodiment for detecting the location of the eyes in real time.

Fig. 11 illustrates an embodiment of determining the opening/closing status of the eyes in an area of detecting the eyes.

### ***THE EFFECT OF THE INVENTION***

According to the present invention, the area to be analyzed can be narrowed by setting the current area of detecting the eyes on the basis of the location of the eyes as set in the past, and the amount of the image information to be processed can be reduced. Accordingly, the present invention performs the image processing in real time, and increases the reliability of the system for deciding the dozing state whilst driving during night driving, and the dozing state whilst driving alarm system.

### ***WHAT IS CLAIMED IS:***

1. A method of deciding a dozing state whilst driving, comprising the steps of:  
detecting an image of a driver in the form of a plurality of pixels;  
determining whether a gradation level of each detected pixel is larger than a certain value, endowing "1" if the detected pixel is larger, and endowing "0" if the detected pixel is smaller, so as to binarize the pixels;  
clustering each of the pixels adjacent to each other that has been endowed "1";  
determining the location of the eyes in the above clustered pixels;  
detecting the current eyes in real time on the basis of the past images of the eyes as set through the above steps;  
detecting the eyes and authorizing the location of the eyes; and  
deciding whether the eyes are closed or opened, and deciding whether the driver is dozing based on the white portions in said area, and the time.